

REMARKS

Claims 1-22 are all the claims pending in the application. Claims 1, 3-6, 9 and 11 have been amended.

Claim 1 has been amended to delete "the steps consisting in".

Claims 3-6, 9 and 11 have been amended to depend only from claim 1.

Entry of the above amendments is respectfully requested.

Initially, the Examiner is respectfully requested to indicate that the drawings filed on March 10, 2006 have been accepted.

I. Response to Objections of claims 1-2, 4-6, 9 and 11 under 37 C.F.R. § 1.75(c)

Claims 4-6, 9 and 11 are objected to under 37 C.F.R. §1.75(c) as being in improper form because they depend from another multiple dependent claim.

Claims 3-6, 9 and 11 have been amended to depend only from claim 1, thereby obviating the objection under 37 C.F.R. § 1.75(c).

In addition, the Examiner asserts that "the steps consisting in" in line 17 of claim 1 should be deleted and that the "steel" in line 2 of claim 2 should be changed to "slab".

Claim 1 has been amended as suggested by the Examiner. However, regarding claim 2, it is respectfully submitted that claim 2 should recite "steel" rather than "slab". For example, on page 3, lines 11-22, the specification discloses that the "steel" has the chemical composition recited in claim 2.

In view of the above, withdrawal of the objections is respectfully requested.

II. Response to Rejection of Claims 1-3 under 35 U.S.C. §103(a)

Claims 1-3 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over

Nakaoka et al. (US 4,336,080) in view of Chatfield et al. (US 4,159,218).

The rejection is respectfully traversed.

Claim 1 recites a process for producing a cold-rolled ferritic/martensitic dual-phase steel strip, wherein a slab, the chemical composition of which comprises, by weight:

$$\begin{aligned}0.010\% \leq C &\leq 0.100\% \\0.050\% \leq Mn &\leq 1.0\% \\0.010\% \leq Cr &\leq 1.0\% \\0.010\% \leq Si &\leq 0.50\% \\0.001\% \leq P &\leq 0.20\% \\0.010\% \leq Al &\leq 0.10\% \\N &\leq 0.010\%\end{aligned}$$

the balance being iron and impurities resulting from the smelting, is hot rolled, said process then comprising the steps consisting in: coiling the hot-rolled strip obtained at a temperature of between 550 and 850° C; then cold rolling the strip with a reduction ratio of between 60 and 90%; then annealing the strip continuously in the intercritical range; and cooling it down to the ambient temperature in one or more steps, the cooling rate between 600°C and the ambient temperature being between 100°C/s and 1500°C/s; and optionally tempering it at a temperature below 300°C, the annealing and cooling operations being carried out in such a way that the strip finally contains from 1 to 15% martensite.

Nakaoka discloses a manufacturing process of cold-rolled steel bands presenting a good workability. The process of Nakaoka is applied to a steel composition that is different from the claimed composition. Indeed, as recognized by the Examiner, the composition of Nakaoka does not contain chromium, whereas the claimed composition contains chromium in an amount of at least 0.01%. Chromium is not an impurity in the claimed invention, despite its low amount, and

is an added element required to obtain the desired martensite percentage in the steel band microstructure.

In addition, the steel of Nakaoka is not martensite. The process disclosed in Nakaoka requires step of overaging, which has a metallurgical effect to turn the eventual martensite into ferrite. This is expressly excluded from the present invention (see page 6, lines 27-39). The Examiner's attention is directed to Table 2 of Nakaoka, where it can be seen that the tensile strengths are between 360 and 480 MPa compared to the values obtained for Examples for the present invention, which ranges from 650 to 720 MPa (see page 9 of the specification). Such a difference in tensile strengths shows that the steels of Nakaoka do not contain martensite at the end of the process.

As noted above, the Examiner recognizes that the composition of Nakaoka does not contain chromium. To make up for the deficiencies, Chatfield is cited as disclosing a dual-phase steel strip containing 0.1-0.7 wt% Cr. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art to add 0.1-0.7 wt% of Cr into the slab of Nakaoka in order to increase hardenability at a cost factor significantly lower than that found in a steel having an increased manganese content. *See* col. 2, lines 8-16 of Chatfield.

Applicant respectfully disagrees.

Chatfield discloses a ferritic and martensitic steel band which has not been cold-rolled or annealed, but which is obtained by a manufacturing process that stops after hot rolling and annealing. Thus, the process for obtaining the steel of Chatfield is different from that of the claimed invention.

In addition, the composition of Chatfield contains too much manganese and silicon. The

chromium is described as "improving the hardenability at a cost factor lower than that found in a steel having an increased manganese content." It is clear from this disclosure that chromium is added in place of manganese to obtain a hard steel at low cost. In contrast, in the claimed invention, chromium is not added in place of manganese, as the claimed level of manganese is much lower, and the role of chromium is to facilitate the formation of martensite, despite the low level of alloying elements, and is not to harden the steel.

Furthermore, it is respectfully submitted that one of ordinary skill in the art would not combine Nakaoka with Chatfield to arrive at the claimed invention.

First, the chemical compositions of Nakaoka and Chatfield are different. That is, Chatfield discloses a steel composition comprising higher amounts of C, Mn and Si compared to Nakaoka's composition. Second, the steels and process of obtaining the steels of Nakaoka and Chatfield are different. Nakaoka's steel is cold-rolled whereas Chatfield's steel is hot-rolled. Third, the final microstructure of the steels are different. Nakaoka's steel contains only ferrite whereas Chatfield's steel contains ferrite and martensite.

Thus, in view of the differences between Nakaoka and Chatfield, one of ordinary skill in the art would not look to Chatfield to modify the composition of Nakaoka by adding 0.1-0.7 wt % of Cr.

Moreover, one of ordinary skill in the art would have no reason to combine Nakaoka and Chatfield since Nakaoka expressly seeks a steel with reduced tensile strength, which is contrary to what Chatfield is looking for.

For at least the above reasons, it is respectfully submitted that there is no motivation to combine Nakaoka with Chatfield, and thus, a *prima facie* case of obviousness has not been

established.

Additionally, the purpose of the claimed invention is to provide a steel with high mechanical properties together with an improved drawing ability. The object of Nakaoka is to cool a low-alloyed steel quickly and to overage it so that it has a low tensile strength due to its ferritic microstructure. *See col. 2, lines 1-5 and 55-62.* Chatfield does not address these issues and is only looking for a reduction of price without reduction of the mechanical properties. Drawing ability is not mentioned and the solution of Chatfield to its problem is to replace manganese by chromium.

The claimed invention provides a ferritic/martensitic structure with a low-alloyed steel which unexpectedly provides both a high tensile strength and a good drawing behavior. Such superior effects could not be expected nor derived from Nakaoka and Chatfield, and the combination of Nakaoka and Chatfield do not result in the claimed invention, as discussed above.

In view of the above, it is respectfully submitted that claims 1-12 are patentable over Nakaoka and Chatfield, and withdrawal of the rejection is respectfully requested.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any

**AMENDMENT UNDER 37 C.F.R. § 1.111
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overpayments to said Deposit Account.

Respectfully submitted,



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